(12) UK Patent Application (19) GB (11) 2 058 272 A

(21) Application No 8026263
(22) Date of filing 12 Aug 1980
(30) Priority data
(31) 7931713
(32) 13 Sep 1979
(33) United Kingdom (GB)
(43) Application published
8 Apr 1981
(51) INT CL³
F16D 25/12
(52) Domestic classification
F2L 10C2 10U 5M1 7B
F2Y 1324 2530 3201 SH
(56) Documents cited
GB 2013816A
GB 1447061
GB 1405548
GB 1317591
GB 787683
(58) Field of search
F2K
F2L
F2Y
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(54) Vibration attenuator

(57) An input pushrod for the hydraulic master cylinder of a motor vehicle clutch release system includes a resilient member in series to attenuate vibration transmitted from the vehicle clutch through the master cylinder to the driver's clutch operating pedal.

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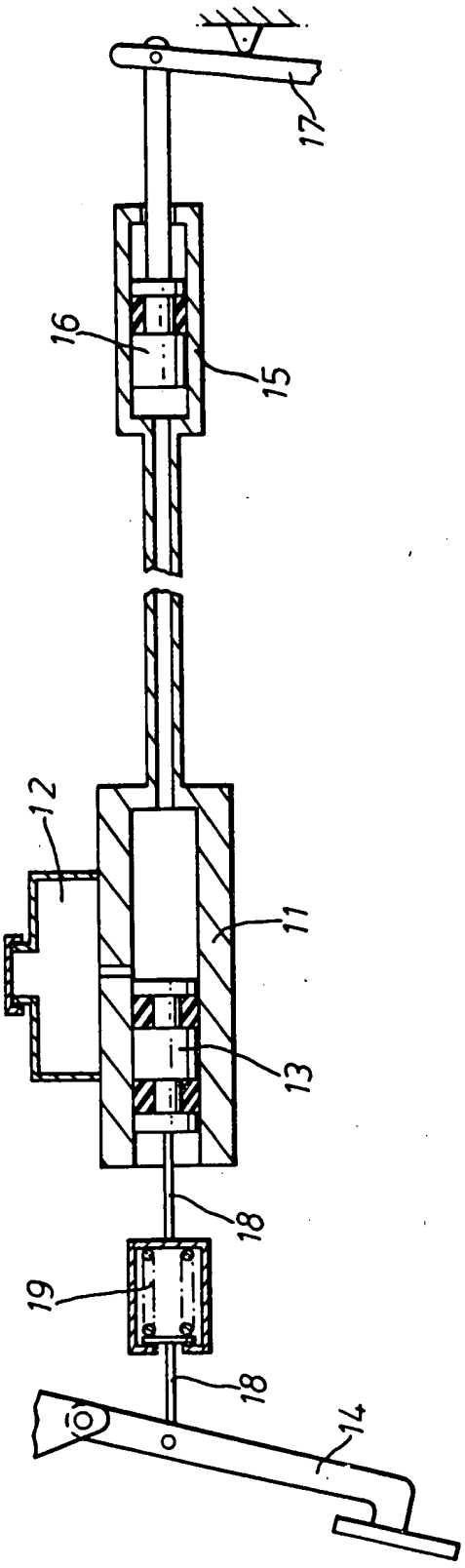
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SPECIFICATION
Vibration attenuator

This invention relates to attenuation of vibration transmitted through hydraulic liquid and is particularly applicable to hydraulic clutch release systems for motor vehicles.

Such release systems are well known and usually comprise a hydraulic master cylinder actuable by a driver's clutch pedal and connected through a fluid pressure duct to a hydraulic slave cylinder. The slave cylinder mechanically operates the clutch release mechanism.

One problem with such systems is that, in use, vibration can be transmitted from the vehicle clutch and through the release mechanism, the fluid pressure duct and the master cylinder to the driver's clutch pedal. The resulting audible noise and mechanical vibration can be objectionable to occupants of the motor vehicle.

The present invention seeks to provide a generally adaptable solution to the aforementioned problem. Though the invention may seem remarkably simple in concept, it is the culmination of considerable engineering effort to find an economical solution which is suitable for differing clutch installations.

According to the invention an input pushrod for a hydraulic master cylinder, said pushrod being capable of transmitting thrust loads from a driver's clutch pedal to the master cylinder, is provided with a resilient member in series so that, in use, vibration transmitted through the master cylinder is attenuated.

Preferably, the resilient member, which may be a coil spring or a rubber pad, exhibits a low hysteresis loss so that the transmitted vibration is absorbed within the resilient member.

Other features of the invention are included in the following description of a preferred embodiment shown, by way of example only, on the accompanying drawing, in which is depicted a schematic illustration of a typical hydraulic clutch release system incorporating the invention.

A master cylinder 11, including the usual liquid reservoir 12, has a piston 13 movable in response to a thrust on a driver's clutch pedal 14 to generate a hydraulic line pressure to a slave cylinder 15. Consequent movement of a slave cylinder piston 16 actuates the release lever 17 a friction clutch (not shown).

The master cylinder input pushrod 18 incorporates in series a coiled compression spring 19.

The spring 19 acts, in use, to attenuate vibration transmitted through the liquid column from the release lever 17 to the clutch pedal 14.

The transmission of vibration to the clutch pedal 14 tends to be associated with high pedal loads. The coil spring may, therefore, be advantageously pre-stressed to act as a strut unt the critical pedal load is reached. Such an arrangement is important where little loss of clutch pedal travel, as the spring compresses under load, can be tolerated. The rate and pre-lo of the spring may be readily altered to suit different clutch installations.

Under certain conditions of use the preload of the spring may be above the release load of the clutch.

CLAIMS

1. An input pushrod for a hydraulic master cylinder, said pushrod being capable of transmitting thrust loads from a driver's clutch pedal to the master cylinder, is provided with a resilient member in series so that, in use, vibratio transmitted through the master cylinder is attenuated.

2. A pushrod according to Claim 1, wherein th resilient member is a rubber pad exhibiting a low hysteresis loss.

3. A pushrod according to Claim 1, wherein th resilient member is pre-loaded.

4. A hydraulic master cylinder for a motor vehicle clutch release system wherein the maste cylinder has an input pushrod including resilient means in series so that, in use, vibration transmitted through the master cylinder to a driver's clutch pedal is attenuated.

5. An input pushrod for a hydraulic master cylinder substantially as described herein and as illustrated by the accompanying drawing.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1981. Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.